

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification³:

G08B 19/00; G09G 3/00

A1

(11) International Publication Number:

WO 82/02448

(43) International Publication Date:

22 July 1982 (22.07.82)

(21) International Application Number: PCT/US81/01663

(22) International Filing Date: 14 December 1981 (14.12.81)

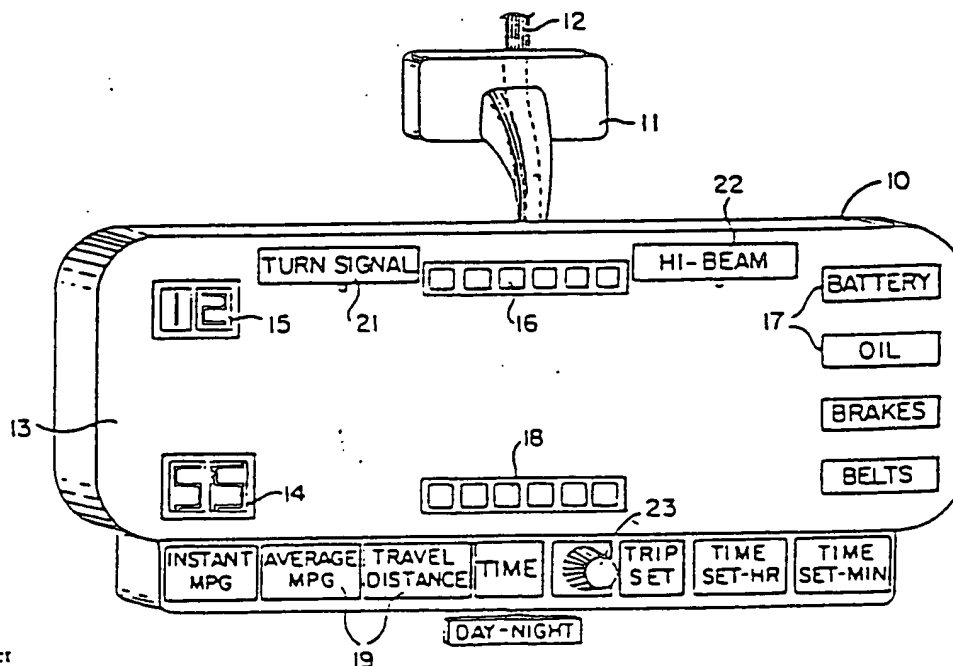
(31) Priority Application Number: 223,819

(32) Priority Date: 9 January 1981 (09.01.81)

(33) Priority Country: US

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WA 98164 (US).(81) Designated States: DE (European patent), FR (Euro-
pean patent), GB (European patent), JP, SE (Euro-
pean patent).Published
With international search report.

(54) Title: A REARVIEW MIRROR HAVING AN ELECTRONIC INSTRUMENT DISPLAY



(57) Abstract

Automotive instruments have traditionally been located in the dashboard about the steering column generally outside the driver's peripheral vision. To see them the driver must take his or her eyes off the road. A novel rearview mirror (13) has an electronic instrument display incorporated into it so that the driver may receive driving information without removing his or her eyes from the road. A speedometer (14), odometer (16), and fuel gauge (15) are easily placed on the mirror (13) so that readouts display through unsilvered portions. 'Trip log' functions (18) and other displays (17, 21 and 22) may also be incorporated. A microprocessor (20) conveniently processes data input and controls the displays.

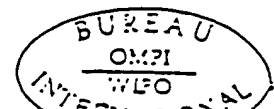
A REARVIEW MIRROR HAVING AN ELECTRONIC INSTRUMENT DISPLAYTechnical Field

This invention relates to a novel rearview mirror which incorporates into it all or most of the instrument readouts desired in automobiles, trucks, or other similar
5 vehicles. Electronic components, such as microprocessors and LEDs, are mounted behind the usual mirror for the vehicle. Signals are displayed through unsilvered portions of the mirror.

10 Background Art

In Canadian Patent 1,063,695, Litman discloses a rearview mirror for a motor vehicle which incorporates repeater lamps connected to the direction indicator system for the vehicle. This arrangement provides greater encour-
15 agement for a driver to use the rearview mirror and direction indicators, thereby reducing automobile accidents. Litman also discloses means to prevent the repeater lamps from dazzling the driver in low levels of general light.

The Litman mirror is a safety advance which merely
20 brushes the surface of available alterations to the interior of a vehicle. Traditionally, automotive instruments have been located in the dashboard about the steering column. The practice arose out of necessity for mounting instruments where they would be visible and rigidly attached. However,
25 continued location in this area hinders safety. The instruments generally are outside the driver's peripheral vision. To see them, the driver must take his or her eyes off the road, at least for an instant. The Litman patent discloses that turn signal indicator lamps can be placed behind the
30 mirror reflective surface. However, the patent does not teach the need for multiple conventional dashboard instrumentation at this more desirable eye level location.



As highlighted at pages 45-48 of the December, 1980, edition of Radio-Electronics, electronics are quickly replacing mechanical and electromechanical instrumentation in a dashboard. Much more information is available in easily read displays, thanks to these advances. However, it is recognized that the displays are still located out of the driver's field of view. Hope lies with heads-up displays used in military jet aircraft. By moving the readouts to the rearview mirror, the desired result may easily be achieved today.

Disclosure of Invention

A novel feature of this invention is its incorporation of an electronic instrument display for travel information, such as speed, mileage, or fuel, within a rearview mirror to bring the display into the peripheral vision of the driver while he or she looks straight ahead and to remove the clutter from about the steering column so that additional safety improvements can be made to the dashboard area. Preferably, the mirror contains all the essential components for the several readouts commonly housed in the dashboard. Microprocessors are small enough today to fit within a mirror housing. Sensors about the vehicle need be the only devices outside the mirror. Alternatively, the mirror may have only the readout electronics, such as LED's, with the processing devices mounted elsewhere in the vehicle.

The mirror has a housing which is attachable to the vehicle, either to the frame or to the windshield. The housing holds a mirror and several instrument displays, such as odometers, speedometers, fuel gauges, systems warnings, and turn signal indicators. Preferably the readouts are placed behind unsilvered portions about the periphery of the mirror. A microprocessor preferably is mounted in the housing to process signals and to display the information on the readouts. Means for electrical communication run from the electronic components in the housing to the vehicle. For mirrors glued to the windshield, the means for communication

include a plurality of wires encapsulated in a transparent film, such as Mylar, which is glued to the windshield also. Conventional wiring processors and sensors are found in the vehicle frame. The mirror may also have trip log function readouts or a common readout with switches for the various functions.

These and other novel features of the present invention will be apparent from the following description, which is given by way of example of a preferred embodiment.

Brief Description of the Drawings

Figure 1 is a schematic of a rearview mirror having an electronic instrument display.

Figure 2 is a partially sectional schematic similar to Figure 1 showing a microprocessor mounted behind the partially silvered mirror.

Best Mode for Carrying Out the Invention

Referring now to Fig. 1, a rearview mirror which incorporates the novel features of this invention is schematically shown. The mirror has a housing 10 which is attachable by suitable means 11 to the frame or windshield of the vehicle. Means for electrical communication 12 extend from the electrical components in the mirror to suitable wiring in the vehicle, which runs to the ordinary sensors for travel information. Preferably, this means 12 includes a plurality of connecting wires of small diameter, arranged in ribbon form and encapsulated in a transparent plastic film (as shown in Fig. 2). Mounted in the housing 10 is a mirror 13 which has unsilvered portions. Signal lights, repeater lamps, or LEDs mounted behind the unsilvered portions emit light which is visible through the mirror 13. Preferably, these unsilvered portions are arranged about the periphery of the mirror 13 so that they do not impair its ordinary function. Alternately, the readouts may be placed around the housing of the mirror or on the glass of the mirror.

As an example of the display possible, Fig. 1 shows a digital speedometer 14 in the lower lefthand corner, an electronic fuel gauge 15 in the upper lefthand corner, digital odometer 16 in the upper center, systems warning lights 17, such as battery, oil, brakes, or seatbelts, along the right edge, and a digital readout 18 in the lower center. Arrayed along the bottom of the mirror are separately identified push-button switches 19 controlling a microprocessor 20 (Fig. 2) to permit display of various "trip log" functions in the readout 18. Preferably, the switches are lighted so that they are identifiable at night. The odometer 16, speedometer 14, and fuel gauge 15 may have individual microprocessors if space permits, or all of the readouts in the mirror may share one microprocessor 20 (Fig. 2). The intensity of light from the displays is controlled with a screw dimmer switch 23. Furthermore, a turn signal indicator 21 and a hi-low beam indicator 22 may be placed at a convenient place in the mirror. The microprocessors 20 might just as easily be placed elsewhere in the vehicle, with only the readout components, such as the LEDs, in the mirror.

The odometer 16 preferably features a permanent semiconductor memory capable of extended data retention even with power removed. Thus, if the battery fails, the accumulated mileage will not be lost.

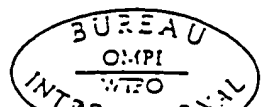
Incorporated by reference as part of this description, M. B. Weinsteins's article entitled "Electronics in your next car," Radio-Electronics, December, 1980, pp. 45-48, discusses the state of the art in electronic displays as well as the numerous options available. Especially relevant is the discussion of "trip log" functions, such as distance traveled, elapsed time, average speed, estimated time of arrival, and distance to destination.

The mirror may also incorporate a clock, if desired. The clock may be made a part of the "trip log" functions whereby display of the time would appear only on selection, or a separate digital readout may be included in the mirror.

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In some circumstances, microtransmitters and microreceivers may be used to communicate between the mirror's readouts and the vehicle's sensors. Medical technology has recently developed these small components, although
5 their use should be avoided if interference causes the transmission to be garbled.

Those skilled in the art will recognize numerous modifications to the preferred embodiment shown and described. Therefore, this invention should not be limited unless
10 limitation is necessary due to the prior art or the nature and spirit of the appended claims.



Claims

I claim:

1. A rearview mirror having an electronic instrument display in it for use in an automobile, truck, or similar vehicle, comprising:

- (a) a housing attachable to the vehicle;
- (b) a mirror attached to the housing for rear viewing;
- (c) a readout for indicating travel information attached to the housing; and
- (d) means for electrical communication between the vehicle and the readout.

2. The mirror of claim 1 wherein the readout is behind an unsilvered portion of the mirror.

3. The mirror of claim 1 wherein the readout is a speedometer.

4. A rearview mirror having an electronic instrument display in it for use in an automobile, truck, or similar vehicle, comprising:

- (a) a housing attachable to the vehicle;
- (b) a mirror attached to the housing for rear viewing;
- (c) a speedometer readout attached to the housing;
- (d) an odometer readout attached to the housing;
- (e) a fuel gauge attached to the housing; and
- (f) means for electrical communication between the vehicle and the readouts in the housing.

5. The mirror of claim 4 wherein the three readouts are behind unsilvered portions of the mirror.

6. The mirror of claim 5, further comprising a micro-processor mounted in the housing to process information and to display it in the several readouts.

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7. The mirror of claim 5 or claim 6, further comprising systems warning lights behind unsilvered portions.

8. The mirror of claim 4, further comprising a digital readout for trip log functions and switches to change the display readout for the functions.

9. The mirror of claim 6, further comprising a digital readout for trip log functions and switches to change the display readout for the functions.

10. The mirror of claim 9, further comprising systems warning lights behind unsilvered portions.

11. The mirror of claim 10, further comprising turn signal indicators behind unsilvered portions of the mirror.

12. The mirror of claim 11, further comprising hi-low beam indicators for the vehicle behind an unsilvered portion of the mirror.

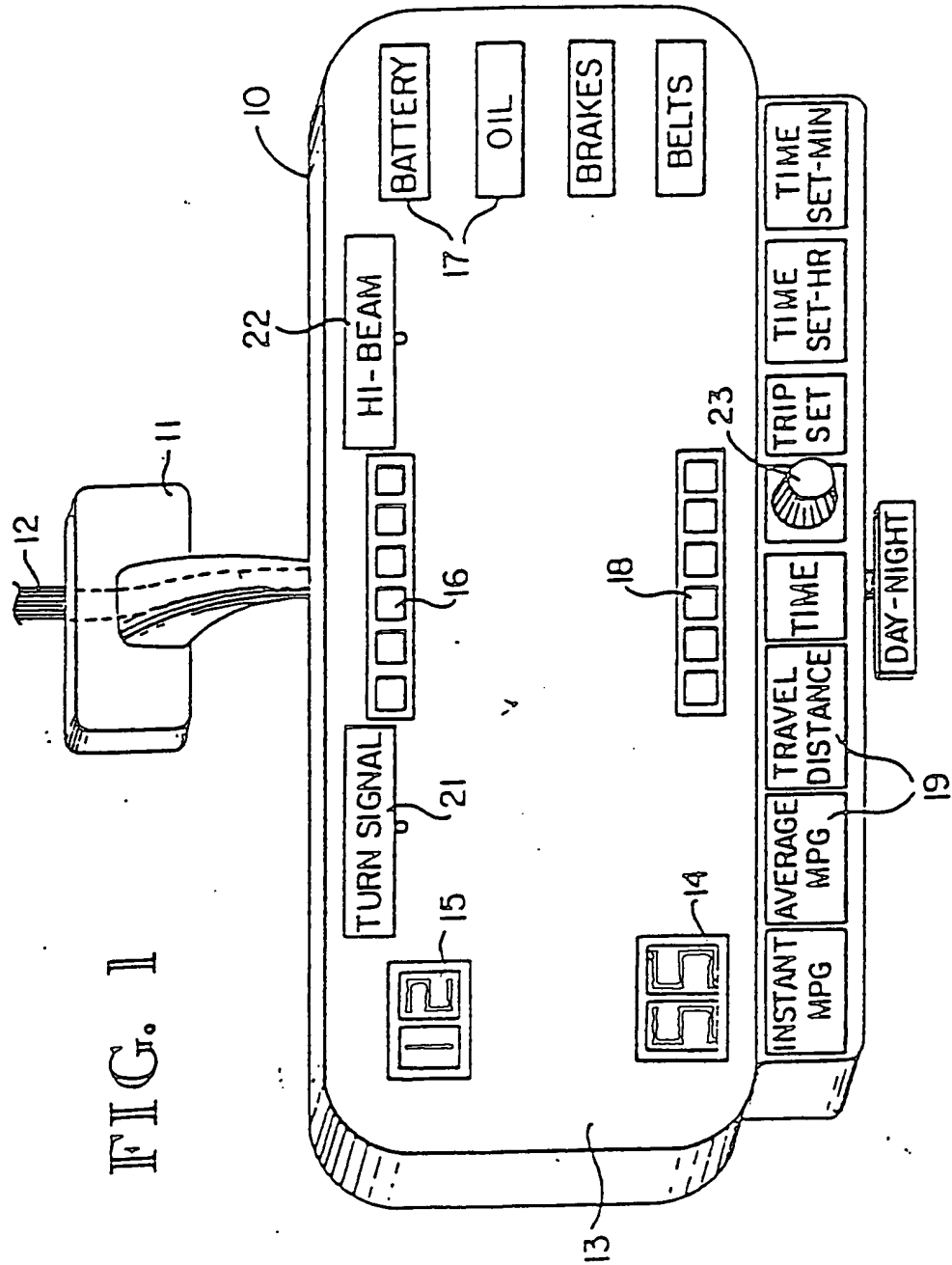
13. The mirror of claim 4 wherein the odometer has a permanent semiconductor memory capable of extended data retention even with power removed.

14. The mirror of claim 1, claim 4, or claim 13 wherein the means for electrical communication have a plurality of wires encapsulated in a transparent film.

15. The mirror of claim 4 wherein the several readouts have LEDs for digital displays.



FIG. 1



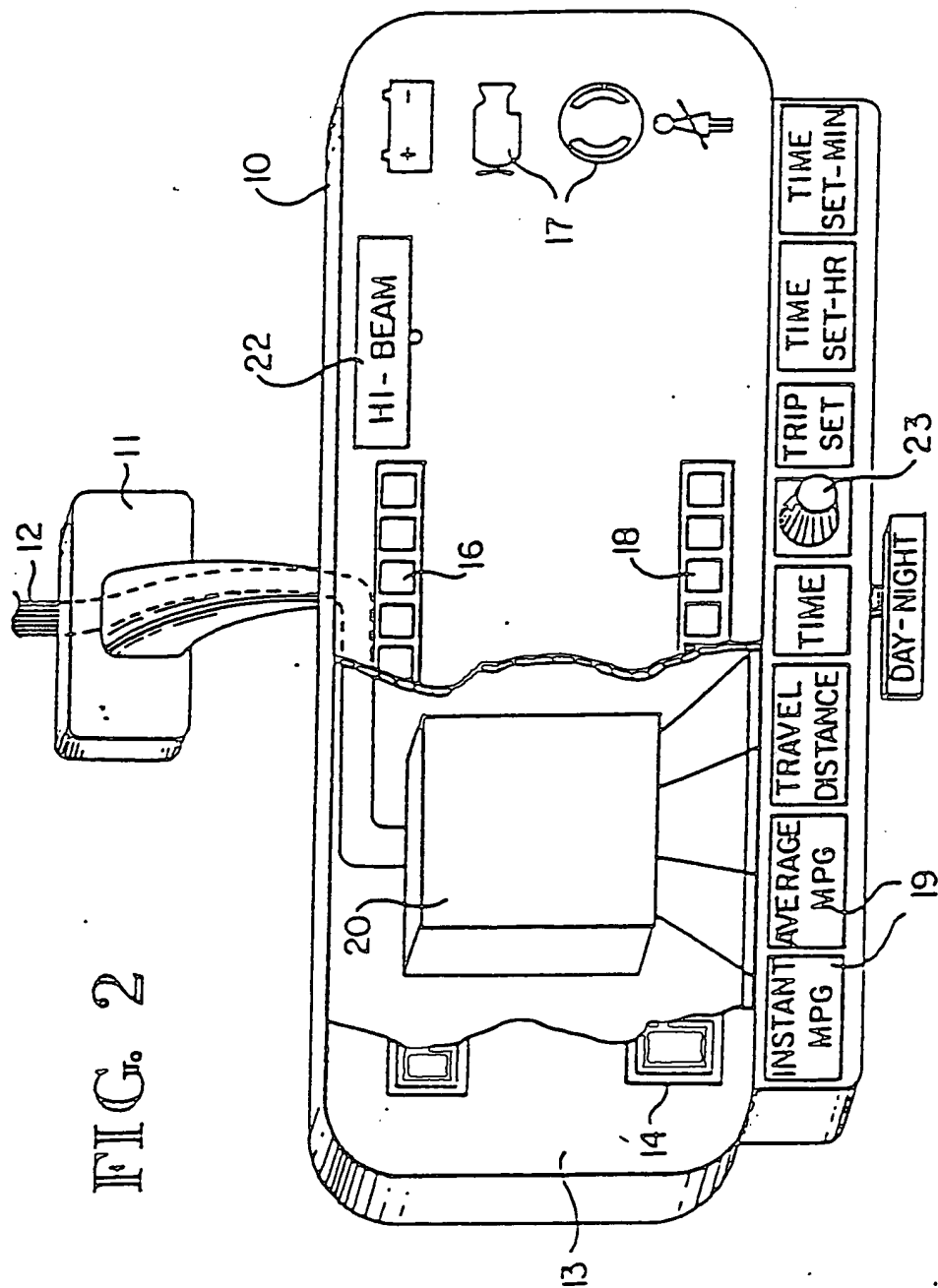


FIG. 2

INTERNATIONAL SEARCH REPORT

International Application No. PCT/US 81/01663

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) ^a		
According to International Patent Classification (IPC) or to both National Classification and IPC		
INT. CL. ³ G08B 19/00; G09G 3/00		
U.S. CL. 340/52F, 670; 364/424		
II. FIELDS SEARCHED		
Minimum Documentation Searched ^a		
Classification System ¹	Classification Symbols	
U.S.	340/52R, 52F, 521, 670 364/424	
Documentation Searched other than Minimum Documentation to the extent that such Documents are included in the Fields Searched ^a		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ^{1a}		
Category ²	Citation of Document, ^{1a} with indication, where appropriate, of the relevant passages ^{1b}	Relevant to Claim No. ^{1c}
X	US, A, 4,109,235, Published 22 August, 1978	1-3, 14/1
A	US, A, 4,035,764, Published 12 July 1977	4-5 7/5, 10-12 14/4, 15 13, 14/13
A	US, A, 4,031,363, Published 21 June 1977	
A	GB, A, 2,048,532, Published 10 December 1980	6, 7/6, 8-9
A	JP, N, Mitsubishi Denki Giho: Vol. 54, No. 10, pp. 29-32, issued 1980, A Liquid-Crystal Automotive Instrument Panel Osamu Shimizu et al	6, 8-12
^a Special categories of cited documents: ^{1b} "A" document defining the general state of the art "E" earlier document but published on or after the international filing date "L" document cited for special reason other than those referred to in the other categories "O" document relating to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but on or after the priority date claimed "T" later document published on or after the international filing date or priority date and not in conflict with the application, but cited to understand the principle or theory underlying the invention "X" document of particular relevance		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search ¹		Date of Mailing of this International Search Report ¹
26 March 1982		08 APR 1982
International Searching Authority ¹		Signature of Authorizing Officer ¹
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